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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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35690 7590 04/01/2009 MEYERTONS, HOOD, KIVLIN, KOWERT & GOETZEL, P.C. P.O. BOX 398 AUSTIN, TX 78767-0398				
EXAMINER JOHNSON, KEVIN M				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

DETAILED ACTION

Election/Restrictions

1. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 37-50, drawn to a method for preparing a synthetic magnesium silicate similar to natural hectorite.

Group II, claim(s) 51-56, drawn to a synthetic magnesium silicate.

2. The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the inventions lack a common special technical feature, as synthetic magnesium silicates are well known in the art.

3. During a telephone conversation on 3/18/2009 a provisional election was made without traverse to prosecute the invention of Group I, claims 37-50. Affirmation of this election must be made by applicant in replying to this Office action. Claims 51-56 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

4. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim

remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Information Disclosure Statement

5. The information disclosure statements (IDS) submitted on 3/2/2006 are in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statements are being considered by the examiner.
6. The information disclosure statement (IDS) submitted on 3/27/2006 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Objections

7. Claim 41 is objected to because of the following informalities: the word "all" between "silicofluoride" and "sodium" in the last line of the claim does not appear to be appropriate. Appropriate correction is required.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 37, 39-44 and 46-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Neumann (GB 1054111) in view of Furusawa et al. (JP 06/345419).

In regard to claims 37, 46 and 47, Neumann teaches a process for the production of synthetic magnesium silicates that have a structure similar to hectorite. The synthesis process includes the formation of a precursor slurry (page 2, column 1, lines 40-45), the hydrothermal treatment of the precursor slurry and washing and filtering the resulting magnesium silicate (page 2, column 2, lines 113-116). Neumann fails to teach that the hydrothermal synthesis takes place in a pipe reactor at the required temperature and pressure for a time of 10 seconds to 4 hours.

Furusawa teaches the production of a synthetic magnesium silicate of the hectorite type. The process includes the formation of a precursor slurry mixture and subjecting the precursor to a hydrothermal process in a pipe reactor to form the

magnesium silicate (abstract). The hydrothermal reaction process takes place at a temperature of 300-400°C and a pressure of 200-300 atm (paragraph 24). The hydrothermal reaction time is approximately 10 minutes (example 1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to conduct the hydrothermal synthesis in the method taught by Neumann in a pipe reactor under the conditions and for the time taught by Furusawa. Such a modification would have been motivated by the teaching in Furusawa that in the production of magnesium silicates from precursor slurries the hydrothermal synthesis may be conducted at a much quicker reaction rate and therefor shorter time period by utilizing a pipe reactor and temperatures and pressures in the required ranges (paragraphs 11 and 12).

In regard to claim 38, Neumann teaches the production of $\text{Si}_8[\text{Mg}_{5.47}\text{Li}_{0.53}]\text{O}_{20}[(\text{OH})_2\text{F}_2]^{0.53}\cdot 0.53\text{Na}^+$ (page 3). Neumann and Furusawa fail to expressly teach that an aqueous solution of magnesium carbonate is formed prior to the formation of the silica precipitate.

It would have been obvious to one of ordinary skill in the art at the time of the invention that by combining the dissolved magnesium salt with sodium carbonate as taught by Neumann would result in an aqueous solution of magnesium carbonate. Aqueous magnesium salt solutions and sodium carbonate are combined in the process taught by Neumann (example I-III).

In regard to claims 39 and 40, Neumann teaches that the precursor slurry is formed by co-precipitating the water soluble magnesium salt magnesium chloride,

sodium silicate and sodium carbonate in the presence of lithium fluoride (example 1). The precursor slurry is described by the following atomic ratios: Si/F of 0.5-5.1, Li/Mg of 0.1-1.0, Si/(Mg+Li) of 0.5-1.5 and Na/(2Mg + F-Li) of 1-2 (pages 1 and 2).

In regard to claim 41, Neumann teaches that hydrofluoric acid and fluosilicic acid may be used in the formation of the precursor slurry as sources of fluorine ions (page 2, lines 61-62 and example 3).

In regard to claim 42, Neumann teaches that the co-precipitation is achieved by boiling and stirring the precursor solutions, but does not expressly teach the temperature at which the boiling takes place (example 1). It would have been obvious to one of ordinary skill in the art at the time of the invention at the time of the invention that temperatures at which the precursor solutions taught by Neumann would boil would be greater than 60°C. Alternatively, it would have been obvious to one of ordinary skill in the art at the time of the invention to co-precipitate the precursor slurry at a temperature of greater than 60°C as a matter of routine optimization of the temperature at which the process is conducted.

In regard to claim 43, Neumann teaches an embodiment of the synthesis process in which magnesium sulfate is added to a mixture of lithium carbonate, hydrofluoric acid and sodium hydroxide prior to the addition of sodium silicate (example III) that appears to meet the requirements of the claims. Neumann also teaches embodiments in which the order of mixing is altered from this designated order (examples I and V). Neumann does not expressly teach the addition of sodium carbonate or sodium hydroxide to a solution of magnesium, lithium and fluorine ions prior to the addition of sodium silicate.

It would have been obvious to one of ordinary skill in the art at the time of the invention to mix the magnesium salt with the lithium and fluoride ions, add the sodium containing solution and then add the sodium silicate. This modification would have been motivated by the teaching in Neumann that the order of mixing may be altered while still producing magnesium silicates of the desired type. It is well established that any order of mixing ingredients is *prima facie* obvious (MPEP 2144.04 IV C).

In regard to claim 44, Neumann teaches the production of $\text{Si}_8[\text{Mg}_{5.47}\text{Li}_{0.53}]\text{O}_{20}[(\text{OH})_2\text{F}_2]^{0.53}\cdot 0.53\text{Na}^+$ (page 3).

In regard to claim 48 and 49, Furusawa teaches a continuous production process utilizing a pipe reactor.

In regard to claim 50, Neumann teaches that the magnesium silicate is dried at a temperature of 110oC to 450oC (page 2, lines 10-11).

12. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Neumann in view of Furusawa as applied to claim 37, and further in view of Neumann (US 4049780, hereafter '780).

In regard to claim 38, Neumann teaches the production of $\text{Si}_8[\text{Mg}_{5.47}\text{Li}_{0.53}]\text{O}_{20}[(\text{OH})_2\text{F}_2]^{0.53}\cdot 0.53\text{Na}^+$ (page 3). Neumann and Furusawa fail to expressly teach that an aqueous solution of magnesium carbonate is formed prior to the formation of the silica precipitate.

In '780 it is taught that the formation of a magnesium carbonate suspension by combining an aqueous magnesium salt solution and sodium carbonate prior to the

formation of a silica precipitate is beneficial to the formation of hectorite type magnesium silicates (column 3, line 66-column 4, line 4).

It would have been obvious to one of ordinary skill in the art at the time of the invention to form an aqueous suspension of magnesium carbonate in which a silica precipitate is formed in the process taught by Neumann. Such a modification would have been motivated by the teaching in '780 that the formation of magnesium carbonate suspensions by combining an aqueous magnesium salt solution and sodium carbonate is beneficial (column 3, line 66-column 4, lines 4) and the teaching in Neumann that aqueous magnesium salt solutions and sodium carbonate are combined in the process (example I-III).

13. Claim 45 is rejected under 35 U.S.C. 103(a) as being unpatentable over Neumann in view of Furusawa as applied to claim 44 above, and further in view of Bauer et al. (US 6274111).

In regard to claim 45, Neumann fails to expressly teach that the pH of the solution is maintained in the required range throughout the precipitation step.

Bauer teaches a similar process for producing synthetic magnesium silicate. The synthesis suspension has a pH of 9-10 throughout the synthesis process (examples 1-4).

It would have been obvious to one of ordinary skill in the art at the time of the invention to maintain the reaction mixture at a pH in the required range. Such a modification would have been motivated by the teaching in Bauer that when producing

synthetic magnesium silicate it is beneficial to utilize a synthesis suspension with a pH of 9-10 (examples 1-4).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KEVIN M. JOHNSON whose telephone number is (571)270-3584. The examiner can normally be reached on Monday-Friday 7:30 AM to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on 571-272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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